WHAT IS CLAIMED IS:

1. A method for the vitrification of biological materials, said method comprising the steps of:

(a) suspending the biological material in a cryoprotective equilibration medium, having a concentration of cryoprotectant(s) below that sufficient to protect against ice formation to the glass transition temperature of the cryoprotective equilibration medium;

(b) rinsing the equilibrated biological material with a vitrification solution, the vitrification medium having a concentration of cryoprotectant(s) sufficient to protect against ice formation to the glass transition temperature of the vitrification medium; and

(c) dropping the vitrification solution-rinsed biological material in microdroplets of vitrification solution onto a solid surface with good heat conductivity having been previously cooled down to about -150°C to about -180°C.

2. The method of claim 1 wherein the biological material is a cell.

3. The method of claim 1 wherein the biological material is an oocyte.

4. The method of claim 1 wherein the biological material is an embryo.

5. An improved method for cryopreserving biological material suspended in a vitrification solution, wherein the improvement comprises contacting microdroplets of the vitrification solution containing the biological material with a solid surface having a temperature of about -150°C to about -180°C, said surface having a good heat conductivity.

6. The method of claim 5 wherein the biological material is a cell.

7. The method of claim 5 wherein the biological material is an oocyte.

8. The method of claim 5 wherein the biological material is an embryo.

9. An improved method for cryopreserving biological material suspended in a vitrification solution, wherein the improvement comprises contacting microdroplets of the vitrification solution containing the biological material with a solid surface having a temperature of about -150°C to about -180°C, said surface having a thermal conductivity at 20°C of greater than about 10 W/(m-k).

10. A method for the vitrification of oocytes, said method comprising the steps of:

(a) suspending the oocytes in a cryoprotective equilibration medium, having a concentration of cryoprotectant(s) below that sufficient to protect against ice formation to the glass transition temperature of the cryoprotective equilibration medium;

(b) rinsing the equilibrated oocytes with a vitrification solution, the vitrification medium having a concentration of cryoprotectant(s) sufficient to protect against ice formation to the glass transition temperature of the vitrification medium; and

(c) dropping the vitrification solution-rinsed oocytes in microdroplets of vitrification solution onto a solid surface with good heat conductivity having been previous cooled down to about -150°C to about -180°C.

11. An improved method of transferring nuclear DNA from a donor cell to an enucleated oocyte, said improvement comprising the step of introducing the nuclear material of the donor cell into an enucleated oocyte derived from an oocyte vitrified by the method of claim 10.

12. An oocyte vitrified by the method of claim 10.

13. An embryo developed from the oocyte of claim 12.

14. A fetus developed from the oocyte of claim 12.

15. An animal developed from the oocyte of claim 12.

16. A cell line developed from the embryo of claim 13.

17. A cell line developed from the fetus of claim 14.

18. A cell line developed from the animal of claim 15.

Sub A6

19. An improved method for cryopreserving oocytes suspended in a vitrification solution, wherein the improvement comprises contacting microdroplets of the vitrification solution containing the oocytes with a solid surface having a temperature of about -150°C to about -180°C, said surface having a thermal conductivity 20°C of greater than about 10 W/(m-k).

20. An oocyte vitrified by the method of claim 19.

21. An embryo developed from the oocyte of claim 20.

22. A fetus developed from the oocyte of claim 20.

23. An animal developed from the oocyte of claim 20.

24. A cell line developed from the embryo of claim 21.

25. A cell line developed from the fetus of claim 22.

26. A cell line developed from the animal of claim 23.

27. An improved method for the parthenogenetic development of vitrified oocytes cultured in a KSOM plus BSA culture system, the improvement comprising co-culturing with cumulus-cells.

Add A7 add C1